

ABSTRACT OF THE INVENTION

A plurality of carbide, such as silicon carbide, tungsten carbide, etc., nanofibrils predominantly having diameters substantially less than about 100 nm and a method for making such carbide nanofibrils. The method includes the steps of: heating a plurality of carbon nanotubes or nanofibrils predominantly having diameters less than about 50 nm in a reaction chamber in the presence of a gas of the form  $Q_nA_m$ , where Q is a metal capable of forming a carbide, A is an element or radical and n and m are integers necessary to satisfy valences, such as, for example silicon monoxide, and an inert gas in a reaction vessel to a temperature substantially less than 1700 C but sufficiently high to cause substantial reaction of the metal in the gas with the carbon of said carbon nanotubes or nanofibrils to form, in situ, solid carbide nanofibrils, the temperature being sufficiently low to prevent substantial fusing together of individual ones of said carbide nanofibrils, removing at least a portion of A-based gas from said reaction chamber as said reaction progresses, and maintaining said temperature until substantially all the carbon of said nanotubes or nanofibrils has been converted into Q-based carbide.